



**Appendix A**  
**Clean Copy of Claims as Amended**

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1. (Twice Amended) An array of at least two different peptides or proteins attached to an optical fiber,  
wherein the array has linear organization;  
wherein each peptide or protein is represented in the array at least twice at discontinuous regions of the array;  
wherein the peptides or proteins are members of a combinatorial library;  
wherein each peptide or protein is attached to a pre-determined portion of the optical fiber; and  
wherein the peptides and proteins are not intermediates leading to a single final product.
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2. (Canceled)
3. The array of claim 1 wherein the agents are proteins.
4. The array of claim 1 wherein the agents are peptides.
5. (Canceled)
6. The array of claim 1 wherein the optical fiber is divided into reactant regions.
7. The array of claim 1 wherein the optical fiber comprises a cladding.
8. The array of claim 7 wherein the cladding is a sol-gel matrix.
9. The array of claim 7 wherein the cladding is a polymer.
10. The array of claim 1 wherein the optical fiber is derivatized.

11. The array of claim 10 wherein the optical fiber is aminopropylsilylated.
12. The array of claim 10 wherein the optical fiber is silylated.
13. The array of claim 1 wherein the optical fiber is coated with at least one layer of cladding.
14. (Canceled)
15. (Canceled)
16. (Canceled)
17. (Canceled)
18. (Canceled)
19. (Canceled)
20. (Canceled)
21. (Canceled)
22. (Canceled)
23. (Canceled)
24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Canceled)

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31. (Amended) An array of at least two different peptides or proteins attached to an optical fiber, wherein the array has linear organization;  
wherein each peptide or protein is represented in the array at least twice at discontinuous regions of the array;  
wherein the peptides or proteins are members of a combinatorial library;  
and wherein the array is prepared by a method which comprises steps of:  
    providing an optical fiber having reactive functionalities;  
    subjecting said fiber to a first set of reagents or reaction conditions, wherein each of said first reagents or reaction conditions cycles with a first specific spatial period along the support, and wherein each individual first reagent or reaction condition in the set is identified as a function of a unique distance or time, so that a first set of peptides or proteins is produced simultaneously on the array, each peptide or protein within first set being related to all other peptides or proteins in the first set as a product of the first set of reagents or reaction conditions, and being separated from other first set peptides or proteins by the first specific spatial period;  
and  
    subjecting said fiber to one or more additional sets of reagents or reaction conditions, wherein each of said additional reagents or reaction conditions cycles with a second specific spatial period along the support, and wherein each individual reagent or reaction

conditions in said one or more additional sets is identified as a second function of unique distance or time, so that at least one additional set of peptides or proteins is produced simultaneously on the array, each peptide or protein within the additional set being related to all other peptides or proteins in the additional set as a product of the additional set of reagents or reaction conditions, and being separated from other additional set peptides or proteins by the second specific spatial period, until a desired array of peptides or proteins is obtained.

32. (Amended) An array of at least two different peptides or proteins attached to an optical fiber, wherein the array has linear organization; wherein each peptide or protein is represented in the array at least twice at discontinuous regions of the array; wherein the peptides or proteins are members of a combinatorial library; and wherein the array is prepared by a method which comprises the steps of:
- a) providing an optical fiber having reactive functional groups,
  - b) winding the fiber around a geometric template,
  - c) dividing the surface of the template lengthwise into regions,
  - d) subjecting each region to one or more reagents or reaction conditions so as to attach reactive moieties or to modify the functional groups, and thereby to simultaneously create a set of peptides or proteins on the fiber in which each peptide or protein in a set is related to all other peptides or proteins in the set as a product of the reagents or reaction conditions that the region was subjected to; and
  - e) repeating steps (b) through (d) until the desired [library] array is obtained.

33. The array of claim 32, wherein the reactive moieties have additional functional groups which are masked by protecting groups, and wherein these protecting groups are removed prior to treatment with one or more reagents or reaction conditions.

34. The array of claim 1, wherein the identity of each peptide or protein in said array is uniquely specified by its location on the fiber.

35. The array of claim 1, wherein each of said peptides or proteins is synthesized from one or

more reagents, and wherein each of said one or more reagents is added at a specific repeat frequency, defined at a specific location on the fiber.

36. (Canceled)

37. (Canceled)

38. The array of claim 1, wherein at least one peptide or protein is present at at least two different positions on the fiber.

39. The array of claim 1, wherein at least two peptides or proteins are each present at at least two different positions on the fiber, successive occurrences of each peptide or protein being separated by a constant interval.

40. The array of claim 1, wherein at least one peptide or protein is present at at least three different positions on the fiber, successive occurrences of the peptide or protein being separated by a constant interval.

41. The array of claim 1, wherein all peptides or proteins are present at at least two different positions on the fiber, successive occurrences of each peptide or protein being separated by a constant interval.

42. The array of claim 1, wherein each different peptide or protein is present at only one position on the fiber.

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43. (Amended) The array of claim 1, wherein the fiber has at least two distinct portions and the array comprises at least a first [synthesis product] peptide or protein attached to a first portion and a second [synthesis product] peptide or protein attached to a second portion.

44. (Amended) The array of claim 43, wherein one or both of said first and second [synthesis products] peptides or proteins include a plurality of distinct [chemical structures] amino acid sequences.

45. The array of claim 43, wherein one or both of said first and second [synthesis products] peptides or proteins include a single [chemical structures] amino acid sequence.

46. The array of claim 43, wherein both of said first and second [synthesis products] peptides or proteins include a single [chemical structures] amino acid sequence.

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47. (Canceled)

48. (Canceled)

49. The array of claim 1, wherein the peptides or proteins are synthesized on the optical fiber.

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50. (Amended) An array of at least two different peptides or proteins attached to an optical fiber, wherein the array has linear organization;  
wherein each peptide or protein is represented in the array at least twice at discontinuous regions of the array;  
wherein the peptides or proteins are members of a combinatorial library; and  
wherein the array is prepared by a method which comprises steps of:

providing an optical fiber having reactive functionalities;

subjecting a first set of portions of the fiber to a first set of reaction conditions or reagents, each portion within said first set of portions being separated from each other by a first specific spatial period so that peptides or proteins that are related to one another as products of exposure to the same first set of reaction conditions are present periodically on the fiber separated from one another by the first specific spatial period; and

subjecting a second set of portions of the fiber to a second set of reaction conditions or reagents, each portion with said second set of portions being separated from each

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other by a second specific spatial period so that peptides or proteins that are related to one another as products of exposure to the same second set of reaction conditions are present periodically on the fiber separated from one another by the second specific spatial period, until a desired array of peptides or proteins is obtained.

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51. (New) The array of claim 1, wherein each peptide or protein is represented in the array at least three times at discontinuous regions of the array.

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52. (New) The array of claim 51, wherein distance from a first occurrence of a particular peptide or protein to a second occurrence of the peptide or protein is equal to distance from the second occurrence of the peptide or protein to a third occurrence of the peptide or protein.

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